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EXAMINER

HO, ALLEN C

ART UNIT

PAPER NUMBER

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/788,335

Applicant(s)

JAFFRAY ET AL.

Examiner

Allen C. Ho

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 February 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-93 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-35 and 63-77 is/are rejected.
- 7) ☒ Claim(s) 78-80 is/are objected to.
- 8) ☒ Claim(s) 36-62 and 81-93 are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3, 10.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-35 and 63-80, drawn to a radiation therapy system and method, classified in class 378, subclass 65.
 - II. Claims 36-62 and 81-88, drawn to an imager support, classified in class 378, subclass 189.
 - III. Claims 89-93, drawn to a method of delineating a target volume located within a body and shown in a computerized tomography image, classified in class 378, subclass 4.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I, II, and III are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention I has separate utility such as a radiation therapy system and method, invention II has a separate utility for providing a support for an imager, and invention III has a separate utility of delineating a target volume located within a body and shown in a computerized tomography image. See MPEP § 806.05(d).
3. During a telephone conversation with John C. Freeman (Reg. No. 34,483) on 31 March 2003 a provisional election was made with traverse to prosecute the invention of I, claims 1-35 and -63-80. Affirmation of this election must be made by applicant in replying to this Office

Art Unit: 2882

action. Claims 36-62 and 81-93 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Drawings

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 114 (page 4, line 26), 407 (page 33, line 25), 411 (page 34, lines 1, 6, 12), 429 (page 35, line 24), 434 (page 35, lines 24, 25), and 458 (page 36, line 13). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

6. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "an alignment laser that allows visualization of said axis of rotation and said source plane" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

7. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "said x-ray source is coincident with

Art Unit: 2882

said radiation source" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

8. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "said gantry is attached to a wall of a room" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

9. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "said gantry rotates about a second axis of rotation" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

10. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "said gantry is attached to a mobile platform that can translationally move on a floor of a room" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

11. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "said x-ray source moves on a sinusoidal or sawtooth path constrained to a surface of a cylinder while the amorphous silicon flat-panel imager moves in a circular path on a surface of a cylinder" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

12. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "said x-ray source and the amorphous

Art Unit: 2882

silicon flat-panel imager each moves on a sinusoidal trajectory on a spherical surface" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

13. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

14. Claim 13 is objected to because of the following informalities:

Claim 13 recites the limitation "said source plane". There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.

15. Claim 69 is objected to because of the following informalities:

Claim 69 should depend on claim 63. Appropriate correction is required.

16. Claim 75 is objected to because of the following informalities:

Claim 75 recites the limitation "said animal". There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. Claims 1, 5, 11, 14-20, 28, 30, 31, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swerdloff *et al.* (U. S. Patent No. 5,661,773) in view of Roos *et al.* (U. S. Patent No. 6,041,097).

With regard to claim 1, Swerdloff *et al.* disclosed a radiation therapy system comprising: a radiation source (12) that moves about a path and directs a beam of radiation towards an object (17); a computer tomography system comprising: an x-ray source (46) that emits an x-ray beam towards the object, and an imager (50) receiving x-rays after they pass through the object, the imager providing an image of the object; and a computer (51) connected to the radiation source and the computer tomography system, wherein the computer receives the image of the object (column 6, lines 56-58) and based on the image sends a signal to the radiation source that controls the path of the radiation source (column 7, lines 9-19).

However, Swerdloff *et al.* did not teach that the computer tomography system comprising a cone-beam x-ray source and an amorphous silicon flat-panel imager.

Roos *et al.* disclosed a computer tomography system that comprises a cone-beam x-ray source (18) and an amorphous silicon flat-panel imager (20).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ a cone-beam computer tomography system, since a person would

be motivated to speed up the imaging process. Furthermore, It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ an amorphous silicon flat-panel imager, since it is less expensive than a CCD detector (it is more expensive to grow high-quality single crystal silicon).

With regard to claim 5, Swerdloff *et al.* and Roos *et al.* disclosed the radiation therapy system of claim 1, comprising a stage (bed) that moves the object relative to the x-ray source and the amorphous silicon flat-panel imager (inherent in a CT).

With regard to claim 11, Swerdloff *et al.* and Roos *et al.* disclosed the radiation therapy system of claim 1, comprising an x-ray source, wherein the x-rays from the x-ray source are emitted along a source plane.

With regard to claims 14-17, Swerdloff *et al.* and Roos *et al.* disclosed the radiation therapy system of claim 1, comprising an amorphous silicon flat-panel imager (70) that comprises a two-dimensional array of individual detector elements (74), wherein each of the individual detector elements comprises a-Si:H photodiode coupled to a transistor (column 3, lines 48-50).

With regard to claims 18-20, Swerdloff *et al.* and Roos *et al.* disclosed the radiation therapy system of claim 1, wherein the computer receives a two-dimensional projection image from the amorphous silicon flat-panel imager and generates a computer tomography of the object based on the two-dimensional projection image (inherent for a CT).

With regard to claim 28, Swerdloff *et al.* and Roos *et al.* disclosed the radiation therapy system of claim 1, wherein the radiation source operates at a power level higher than that of the

Art Unit: 2882

x-ray source, wherein the radiation is of an intensity and energy that is effective for radiation treatment of an area of the object (inherent).

With regard to claim 30, Swerdloff *et al.* and Roos *et al.* disclosed the radiation therapy system of claim 1, wherein the x-ray source is coincident with the radiation source (when they are at the same angular position).

With regard to claim 31, Swerdloff *et al.* and Roos *et al.* disclosed the radiation therapy system of claim 1, wherein the x-ray source is displaced (circumferentially along the gantry) relative to the radiation source.

With regard to claim 35, Swerdloff *et al.* and Roos *et al.* disclosed the radiation therapy system of claim 1, further comprising an imaging device (50') positioned opposite the radiation source and generating an image of the object based on the radiation from the radiation source that passes through the object.

19. Claims 2, 3, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swerdloff *et al.* (U. S. Patent No. 5,661,773) and Roos *et al.* (U. S. Patent No. 6,041,097) as applied to claim 1 above, and further in view of Cullity (1978).

With regard to claims 2 and 3, Swerdloff *et al.* and Roos *et al.* disclosed the radiation therapy system of claim 1, comprising a radiation source (12).

However, these references do not teach that the x-ray source is a KV x-ray source, and it emits x-rays with energies of approximately 100 KeV.

Cullity taught that in order to produce x-rays, electrons are accelerated to energy in the KeV range (*bremsstrahlung* radiations).

Art Unit: 2882

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to accelerate electrons in the energy range of KeV, since a person would be motivated to produce x-rays. Furthermore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide an x-ray source that emits x-rays with energies of approximately 100 KeV, since a person would be motivated to produce x-rays in a suitable energy range based on the mass density of the object.

With regard to claim 7, Swerdloff *et al.* and Roos *et al.* disclosed the radiation therapy system of claim 2, comprising a stage (bed) that moves the object relative to the x-ray source and the amorphous silicon flat-panel imager (inherent in a CT).

20. Claims 4 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swerdloff *et al.* (U. S. Patent No. 5,661,773) and Roos *et al.* (U. S. Patent No. 6,041,097) as applied to claim 1 above, and further in view of Rand *et al.* (U. S. Patent No. 5,719,914).

With regard to claim 4, Swerdloff *et al.* and Roos *et al.* disclosed the radiation system of claim 1, comprising an x-ray source.

However, these references do not teach that the x-ray source comprises a linear accelerator.

Rand *et al.* disclosed an x-ray source that comprises a linear accelerator.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to x-rays from a linear accelerator, since a linear accelerator is capable of producing more intense x-rays than ordinary x-ray tubes.

Art Unit: 2882

With regard to claim 9, Swerdloff *et al.* and Roos *et al.* disclosed the radiation therapy system of claim 4, comprising a stage (bed) that moves the object relative to the x-ray source and the amorphous silicon flat-panel imager (inherent in a CT).

21. Claims 6, 8, 10, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swerdloff *et al.* (U. S. Patent No. 5,661,773) and Roos *et al.* (U. S. Patent No. 6,041,097) as applied to claims 5, 7, and 9 above, and further in view of Dobbs (U. S. Patent No. 6,148,058).

With regard to claims 6, 8, and 10, Swerdloff *et al.* and Roos *et al.* disclosed the radiation therapy system of claims 5, 7, and 9, comprising a stage (bed) that moves the object relative to the x-ray source and the amorphous silicon flat-panel imager (inherent in a CT).

However, these references do not teach that the stage rotates about an axis of rotation the object relative to the x-ray source and the amorphous silicon flat-panel imager.

Dobbs *et al.* disclosed a CT scanner that comprises a stage (22) rotating about an axis of rotation (28) relative to an x-ray source (12) and an imager (14).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ a stage that rotates about an axis of rotation relative to the x-ray source and the amorphous silicon flat-panel imager, since there are occasions a patient must be imaged in an up-right position.

With regard to claim 12, Swerdloff *et al.*, Roos *et al.*, and Dobbs disclosed the radiation therapy system of claim 6, wherein the x-rays from the x-ray source are emitted along a source plane that is perpendicular to the axis of rotation.

Art Unit: 2882

22. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Swerdloff *et al.* (U. S. Patent No. 5,661,773) and Roos *et al.* (U. S. Patent No. 6,041,097) as applied to claim 10 above, and further in view of Röckseisen (U. S. Patent No. 5,675,625).

With regard to claim 13, Swerdloff *et al.* and Roos *et al.* disclosed the radiation therapy system of claim 10.

However, these references do not teach that the radiation therapy system further comprises an alignment laser that allows visualization of the axis of rotation and the source plane.

Röckseisen disclosed an alignment laser that allows visualization of the axis of rotation .

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ an alignment laser that allows visualization of the axis of rotation and a source plane, since a person would be motivated to align the x-ray beam with the isocenter of the object.

23. Claims 21, 22, 24, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swerdloff *et al.* (U. S. Patent No. 5,661,773) and Roos *et al.* (U. S. Patent No. 6,041,097) as applied to claim 1 above, and further in view of Suzuki *et al.* (U. S. Patent No. 6,318,892 B1).

With regard to claim 21, Swerdloff *et al.* and Roos *et al.* disclosed the radiation therapy system of claim 1, comprising a gantry (44), an x-ray source, and an amorphous silicon flat-panel imager.

However, these references do not teach that the radiation therapy system further comprises a first arm and a second arm, wherein the x-ray source is attached to the first arm and the amorphous silicon flat-panel imager is attached to the second arm.

Suzuki *et al.* disclosed CT system that comprises a gantry (102) with a first arm (103) and a second arm (104), an x-ray source (105), and an imager (106), wherein the x-ray source is attached to the first arm and the imager is attached to the second arm.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to attach the x-ray source and the amorphous flat-panel imager to arms external to the gantry, since a person would be motivated to mount the x-ray source and the amorphous flat-panel imager in such a manner to provide a physician easy access to a patient during interventional radiology (IVR).

With regard to claim 22, Swerdloff *et al.*, Roos *et al.*, and Suzuki *et al.* disclosed the radiation therapy system of claim 21, wherein the gantry rotates about an axis of rotation.

With regard to claim 24, Swerdloff *et al.*, Roos *et al.*, and Suzuki *et al.* disclosed the radiation therapy system of claim 21

However, these references do not teach that the gantry is attached to a wall of a room.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to attach the gantry to a wall of a room, since a person would be motivated to stabilize the gantry during its operation.

With regard to claim 29, Swerdloff *et al.*, Roos *et al.*, and Suzuki *et al.* disclosed the radiation therapy system of claim 21, wherein the radiation source operates at a power level higher than that of the x-ray source, wherein the radiation is of an intensity and energy that is effective for radiation treatment of an area of the object (inherent).

24. Claims 23 and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swerdloff *et al.* (U. S. Patent No. 5,661,773), Roos *et al.* (U. S. Patent No. 6,041,097), and

Art Unit: 2882

Suzuki *et al.* (U. S. Patent No. 6,318,892 B1) as applied to claim 22 above, and further in view of Fujita *et al.* (U. S. Patent No. 5,848,126).

With regard to claim 23, Swerdloff *et al.*, Roos *et al.*, and Suzuki *et al.* disclosed the radiation therapy system of claim 22.

However, these references do not teach that the gantry rotates about a second axis of rotation.

Fujita *et al.* disclosed a gantry that rotates about a second axis of rotation (Fig. 27B).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a gantry that rotates about a second axis of rotation, since a person would be motivated to provide a doctor access to a patient during surgery (column 22, lines 5-13).

With regard to claim 25, Swerdloff *et al.*, Roos *et al.*, Suzuki *et al.*, and Fujita *et al.* disclosed the radiation therapy system of claim 23.

However, these references do not teach that the gantry is attached to a wall of a room.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to attach the gantry to a wall of a room, since a person would be motivated to stabilize the gantry during its operation.

With regard to claims 26 and 27, Swerdloff *et al.*, Roos *et al.*, and Suzuki *et al.* disclosed the radiation therapy system of claim 22.

However, these references do not teach that the gantry is attached to a mobile platform that can translationally move on a floor of a room.

Art Unit: 2882

Fujita *et al.* disclosed a gantry that is attached to a mobile platform that can translationally move on a floor of a room (Fig. 23A).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a gantry that is attached to a mobile platform that can translationally move on a floor of a room, since a person would be motivated to provide a doctor access to a patient during surgery.

25. Claims 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swerdloff *et al.* (U. S. Patent No. 5,661,773) and Roos *et al.* (U. S. Patent No. 6,041,097) as applied to claim 1 above, and further in view of Richey *et al.* (U. S. Patent No. 4,547,892).

With regard to claims 32-34, Swerdloff *et al.* and Roos *et al.* disclosed the radiation therapy system of claim 1.

However, these references do not teach operating the cone-beam computer tomography system with an external trigger that controls a biological process of a patient.

Richey *et al.* taught using cardiac (ECG) and breathing motion (pulmonary) signals as external triggers in CT imaging (column 5, lines 56-61).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use cardiac (ECG) and breathing motion (pulmonary) signals as external triggers in CT imaging (column 5, lines 56-61), since a person would be motivated to minimize any motion or activity in the object which would make accurate image reconstruction difficult (column 1, lines 16-18).

Art Unit: 2882

26. Claims 63, 66-69, and 73-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swerdloff *et al.* (U. S. Patent No. 5,661,773) in view of Roos *et al.* (U. S. Patent No. 6,041,097).

With regard to claim 63, Swerdloff *et al.* disclosed a method of treating an object (17) with radiation, comprising: moving a radiation source (12) about a path; directing (51) a beam of radiation from the radiation source towards the object; emitting an x-ray beam (46) towards the object; detecting x-rays that pass through the object due to the emitting an x-ray beam with an imager (50); generating an image (60) of the object from the detected x-rays; and controlling the path of the radiation source based on the image (column 7, lines 9-19).

However, Swerdloff *et al.* did not teach emitting an x-ray beam in a cone beam form and detecting x-rays that pass through the object due to the emitting an x-ray beam with an amorphous silicon flat-panel imager.

Roos *et al.* disclosed a computer tomography system that comprises a cone-beam x-ray source (18) and an amorphous silicon flat-panel imager (20).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ a cone-beam computer tomography system, since a person would be motivated to speed up the imaging process. Furthermore, It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ an amorphous silicon flat-panel imager, since it is less expensive than a CCD detector (it is more expensive to grow high-quality single crystal silicon).

With regard to claims 66-68, Swerdloff *et al.* and Roos *et al.* disclosed the method of claim 63, comprising an amorphous silicon flat-panel imager (70) that comprises a two-

Art Unit: 2882

dimensional array of individual detector elements (74), wherein each of the individual detector elements comprises a-Si:H photodiode coupled to a transistor (column 3, lines 48-50).

With regard to claim 69, Swerdloff *et al.* and Roos *et al.* disclosed the method of claim 66, wherein the generating comprises forming a computer tomography image of the object based on the detected x-rays (inherent for a CT).

With regard to claim 73, Swerdloff *et al.* and Roos *et al.* disclosed the method of claim 69, further comprising correcting for offset and gain prior to the generating (Roos *et al.*, column 6, lines 54-58).

With regard to claims 74-76, Swerdloff *et al.* and Roos *et al.* disclosed the method of claim 63, wherein the object comprises an animal (patient), and wherein the image delineates soft tissue (122) within the animal. The soft tissue selected could be from the group consisting of fat, a muscle, a kidney, a stomach, a bowel, and a liver (inherent in a CT scan).

27. Claim 64 is rejected under 35 U.S.C. 103(a) as being unpatentable over Swerdloff *et al.* (U. S. Patent No. 5,661,773) and Roos *et al.* (U. S. Patent No. 6,041,097) as applied to claim 63 above.

With regard to claim 64, Swerdloff *et al.* and Roos *et al.* disclosed the method of claim 63.

However, these references do not teach that the x-rays in the x-ray beam have an energy of approximately 100 KeV.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide an x-ray source that emits x-rays with energies of approximately

Art Unit: 2882

100 KeV, since a person would be motivated to produce x-rays in a suitable energy range based on the mass density of the object.

28. Claims 65 and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swerdloff *et al.* (U. S. Patent No. 5,661,773) and Roos *et al.* (U. S. Patent No. 6,041,097) as applied to claim 63 above, and further in view of Dobbs (U. S. Patent No. 6,148,058).

With regard to claims 65, Swerdloff *et al.* and Roos *et al.* disclosed the method of claim 63.

However, these references do not teach that the method further comprises the step of rotating about an axis of rotation the object relative to the x-ray source and the amorphous silicon flat-panel imager.

Dobbs *et al.* disclosed a CT scanner that comprises a stage (22) rotating about an axis of rotation (28) relative to an x-ray source (12) and an imager (14).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ a stage that rotates about an axis of rotation relative to the x-ray source and the amorphous silicon flat-panel imager, since there are occasions a patient must be imaged in an up-right position.

With regard to claim 77, Swerdloff *et al.*, Roos *et al.*, and Dobbs disclosed the method of claim 65, wherein the image is formed after one rotation of the body relative to the x-ray source and the amorphous flat-panel imager (that is just a 360° scan).

29. Claim 70 is rejected under 35 U.S.C. 103(a) as being unpatentable over Swerdloff *et al.* (U. S. Patent No. 5,661,773), Roos *et al.* (U. S. Patent No. 6,041,097), and Dobbs (U. S.

Art Unit: 2882

Patent No. 6,148,058) as applied to claim 65 above, and further in view of Fujita *et al.* (U. S. Patent No. 5,848,126).

With regard to claim 70, Swerdloff *et al.*, Roos *et al.*, and Dobbs disclosed the method of claim 65.

However, these references do not teach that the method further comprises the step of rotating about a second axis of rotation the object relative to the x-ray source and the amorphous silicon flat-panel imager.

Fujita *et al.* disclosed a gantry that rotates about a second axis of rotation (Fig. 27B).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a gantry that rotates about a second axis of rotation, since a person would be motivated to provide a doctor access to a patient during surgery (column 22, lines 5-13).

30. Claims 71 and 72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swerdloff *et al.* (U. S. Patent No. 5,661,773) and Roos *et al.* (U. S. Patent No. 6,041,097) as applied to claim 63 above, and further in view of Brown *et al.* (U. S. Patent No. 5,751,781).

With regard to claims 71 and 72, Swerdloff *et al.* and Roos *et al.* disclosed the method of claim 63.

However, these references do not teach that the method further comprises the step of emitting a second set of x-rays from the radiation source, the second set of x-rays have an intensity and energy that is effective for radiation treatment of an area of the body.

Brown *et al.* taught treating a patient with high-energy x-rays (column 6, lines 49-53).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to treat a patient with high-energy x-rays, since a person would be motivated to treat a patient with x-rays having appropriate intensity and energy. Furthermore, the second set of x-rays would have an intensity and energy greater than the x-rays emitted from the x-ray source, since the second set of x-rays are intended to destroy tumors and/or cancerous tissues.

Allowable Subject Matter

31. Claims 78-80 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

32. The following is a statement of reasons for the indication of allowable subject matter:

With respect to claims 78 and 79, although the prior art discloses the method of claim 63, it fails to teach or fairly suggest that the x-ray beam is generated by an x-ray source that moves independently of the amorphous silicon flat-panel imager, the x-ray source moves on a sinusoidal or sawtooth path constrained to a surface of a cylinder while the amorphous silicon flat-panel imager moves in a circular path on a surface of a cylinder.

With regard to claim 80, although the prior art discloses the method of claim 63, it fails to teach or fairly suggest that the x-ray beam is generated by an x-ray source that moves independently of the amorphous silicon flat-panel imager, the x-ray source and the amorphous silicon flat-panel imager each moves on a sinusoidal trajectory on a spherical surface.

Art Unit: 2882

Conclusion

33. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- (1) Kanematsu (U. S. Patent No. 6,385,288 B1) disclosed a radiotherapy apparatus with independent rotation mechanisms.
- (2) Fitchard *et al.* (U. S. Patent No. 6,385,286 B1) disclosed a delivery modification system for radiation therapy.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (703) 308-6189. The examiner can normally be reached on Monday - Friday from 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached at (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0530.

Allen C. Ho
Examiner
Art Unit 2882

ACH
April 3, 2003



DAVID V. BRUCE
PRIMARY EXAMINER

Application/Control Number: 09/788,335

Page 21

Art Unit: 2882